



SHENTON'S VILLA

REMINISCENCES FROM THE SCHOOL
OF MINING AND ENGINEERING
OF THE UNIVERSITY OF WESTERN AUSTRALIA.

A paper presented to the Institution of Engineering

By

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Reminiscences from the School of Mining and Engineering of the
University of Western Australia

The University of Western Australia was incorporated and endowed by an Act of the State Legislature, entitled the University of Western Australia Act 1911.... which received the Royal Assent on the 16th February, 1911. The first Senate was appointed by the notice in the Government Gazette of the 13th February, 1912, and the Convocation was formally declared to be in existence on the 21st February, 1913.

The Senate established three Faculties for the teaching of Arts, Science, including Agriculture and Engineering and appointed eight professors to fill the chairs of English, History and Economics, Biology, Chemistry, Geology, Physics and Mathematics, Agriculture, Mining and Engineering, to start the infant University on its career.

The man chosen to fill the chair of Mining and Engineering was Hubert Edwin Whitfield, who had graduated at the University of Sydney both in the Arts and Engineering, since when he had a varied experience in the Australian mining fields. This practical mining experience was considered a strong qualification by members of the Senate, on whom fell the task of choosing the first professors. By the second decade of the 20th Century, gold mining in Western Australia had fallen sharply from its glorious position of the nineties. This was due in part to the world wide conditions but the founders of the University had hopes that if new and younger mining engineers were pruned in the profession they might find new ways of making the old mines profitable.

In actual fact, none of the early students could be induced to take Mining Engineering as their principal subject. It needed the revival of the mining industry due to altered world conditions and the consequent high price of gold to induce young men to take up this particular branch of learning.

The Senate, in June 1913 asked the Professorial Board to nominate three persons for the position of Vice-Chancellor, and on July 21st Professor Whitfield was appointed Vice-Chancellor for one year. He actually held the position until he left for Europe in 1916.

At that time the Vice-Chancellorship was an honorary position and an extremely onerous one as its occupant had both to look after the University as a whole and to run his own Faculty.

In determining the composition of the Faculty of Engineering the Professor adopted a principle which was to be amply justified in the years that followed. He decided to appoint members of the engineering profession outside the University to sit together with those professors and lecturers who were actually engaged in teaching. Therefore, the first Faculty, in addition to the following members, the Chancellor and the Pro Chancellor ex officio the Professors of Mining and Engineering, Maths and Physics, Chemistry, Geology, the Lecturers in Maths, Physics and Engineering included the Engineer-In-

Chief, the State Mining Engineer, the Chief Electrical Engineer, a member nominated by the Senate, and a representative of each of the following:-

The Commissioner of Railways, the West Australian Institute of Engineers and the Chamber of Mines.

One of the first tasks of the Faculty was the adequate staffing of the department of the school. They recommended to the Senate the appointment of two lecturers to assist the Professor and in September 1913 Mr A. Tomlinson was appointed the Assistant Lecturer becoming Lecturer in 1914. As his training both in England and in Western Australia had been in Railway Construction, he was allotted Structural Engineering. In April 1915 Mr P.H. Fraenkel was appointed Lecturer in Electrical Engineering.

The first students in the Faculty were mostly men who had been unable to continue their studies at an Eastern States University, owing to the distance. Nearly all of them had had some engineering education at one or other of the Technical Schools already established in Western Australia, and they were older than other students working in other Australian Universities and older than those who in later years entered the Faculty. The age of the first students had a profound influence on the Engineering School, an influence which was to last a good many years and which gave the young school an advantage over the longer established departments in the Eastern States.

The first curriculum which was based on a four years "Sandwich System" comprised first and second term inside the school, third term and the long vacation in works outside. This system worked particularly well with the older students, and its later modification has been largely due to the fact that the Faculty has had to admit students less mature.

Along these lines had the future progress of the school been soundly planned when the war rudely interfered, twenty of the students enlisted five were killed in action or died from the effects of their injuries, Messrs. H.J. Appel. L. Poole, Ch. P. Long, E.A. Roberts, and E.R. Tobias, and for various reasons few of those who returned were able to resume their studies.

In 1916, moreover, when he had succeeded in establishing the department but before he had been able to mould this new thing into a really coherent whole the Professor himself left for special service in Europe and the United States, and Mr Tomlinson became Acting Professor.

Mr Tomlinson had a wellnigh impossible task in trying to carry on with the scheme as outlined by the absent Professor. From the latter part of 1918, moreover, he was without the co-operation of the other original Lecturer in the Faculty, against whom, as a former

national of a neutral European Country, the zeal of some of the local patriots had been misdirected. The strain of adapting the school to the exceptional circumstances of the later war years may well have been a contributing factor in the untimely death of Associate Professor Tomlinson (as he had then become in 1925.)

The peculiar war-time conditions necessitated sweeping modifications in the working of the Engineering School. Not only had two lecturers to do the work of three, but the new students were for the most part younger men, more interested in the prospect of war service, when they reached military age, than in becoming efficient engineers. To meet these altered circumstances the curriculum was revised, the course was reduced from the four years to three, the Sandwich System was abolished and more Science was introduced and as a consequence the degree of B Eng. was suspended and a degree of Bachelor of Science of Eng. substituted. One lecturer undertook to lecture in Structural Engineering as well as in various aspects of Railway and Civil Engineering, while the other undertook to lecture Electrical, Mechanical and Hydraulic Engineering. The strain both upon lecturers and students was extreme and looking back one can but admire the forbearance and understanding with which the student body bore this trial without any complaints.

and the The closer association between the several departments of the Science/Faculty of Arts was housed in temporary buildings at Irwin Street in Perth emphasising the isolation and inaccessibility of the Engineering School at Crawley.

When the University was established only a few foresighted men recognised that the Crawley position was an ideal one for its permanent position. One of them the Professor of Engineering, put his conviction into practise by establishing his school in the late Mr Shenton's home at Crawley. Although the people of Western Australia can largely thank the Professor's courage for their present magnificent site, not many of the students were able to appreciate the pioneering work that they were called upon to carry out when they had to walk two miles through mud from Point Lewis, or half a mile through sand from Broadway to attend lectures. Those were the nearest points of vehicular traffic, and as the trams to Broadway took about fifty minutes to make the journey from Perth, the students required the best part of an hour to reach school. It must be realised that at that time the land between Broadway and the river and right back to Rokeby Road was nothing but dense bush. Bridle paths ran through it as did the main Perth - Fremantle road in which one was liable to be bogged in the winter and covered in dust in the summer. The Professor himself was in the habit of walking the three miles from his home in West Perth to the school. Not until early in 1915 was the tram along the Mounts Bay Road, which till then terminated at Point Lewis, extended to a point three chains within the present

University grounds, and then later in the same year extended to Nedlands. Thus the Engineering Students of 1916 were the first able to travel by tram nearly the whole distance between Irwin Street and the Engineering School.

The isolation of the school may well be gathered from the fact that before June 1921 no police was established at Nedlands, where now two policemen are considered necessary. The absence of the guardians of the law, made itself felt in the camps established near on what is now known as the Parks and Gardens Board's ground. The camps in the new mining districts of today are palaces compared to the ramshackle sheds then erected along the river right in front of the school. Sanitary arrangements were totally inadequate and in many cases totally absent. The school itself had its present septic tank system installed in 1922. The roofs of the sheds were beaten kerosene tins with two or more tins placed on top of each other for chimneys; bags served for walls and sand for a floor. Some of these residences were used all the year round.

The school itself consisted of Shenton's villa, together with a large stable, some low lean to sheds and one milking shed, one of which still remains. The villa was brick and stone structure with an iron roof, consisting of a ground floor with three rooms and an upper storey with four rooms and a bathroom. From this a wing had been built of bricks manufactured from the clay deposits on the site itself. The wing had three rooms on the ground floor and three on the top floor. At the end of 1913 a verandah was built around one half of the villa and later in 1918 was enclosed for mechanics of machinery equipment while the lower floor of the wing was filled with gear for the testing of material. One room on the ground floor was used as a lecture room, the other as a mechanics of machinery laboratory and the third as the Professor's office. On the top floor a library was housed in the smallest room and drawing tables in the largest; the rest serving as lecturers offices. The stable was used for steam and gas machinery, the largest of which was a six H.P. horizontal engine driven by a boiler, much too small for just outside. The yard contained various mining machinery obtained as rejects from the mines and the Electrical Department boasted the armature for some defunct generator whilst a garage was used for a workshop. This equipment was, of course, not meant to suffice for any length of time, but the war lasted nearly four years and what was perhaps worse from the point of view of obtaining laboratory equipment, the high prices ruling after the war made the purchase of new material almost impossible. Even so, certain windfalls came our way; for instance, five electrical generators were bought cheap in 1916 and sold in 1917-18 with great profit to the University, the proceeds being used to purchase a really up-to-date gas plant which is still working satisfactorily. This, together with the timber drying kiln was in order by the end of 1918. By the begging and borrowing the first machine shed, 70 x 20, the so-called Scaddan Shed stood finished in 1920. The late Mr Scaddan, then Minister for Mines,

had been able to make the material available to the University free of cost. Much of it was erected by the students in their spare time.

From these few facts placed on paper so many years later, it would at first sight seem well nigh impossible to teach any engineering adequately under such conditions. It may be, however, that the inadequacy of the material and that the students were compelled not only to erect all the machinery themselves, but also to plan the new ways of getting at facts and the laws of mechanics with such primitive apparatus, that made them in the end more efficient engineers, trained to use common sense, and above all, to think for themselves and to weigh possibilities, than the student from better equipped schools. It certainly made them more enthusiastic in improving the equipment and so enhancing the reputation and raising the standard of their school. Their pride of achievement when a test after long toil could at last be carried out or a new piece of machinery was running smoothly was undoubtedly something worth striving for.

The following example will illustrate the kind of job undertaken by the students. A tank stand 40 ft high capable of carrying 8000 gallons of water was needed alongside the laboratories in 1921. A suitable stand was already erected in the grounds about 3,000 yards away. The students did all the work, both of demolishing the existing stand and erecting it in the new site. They completed the job to everyone's satisfaction. The tank is still in use today in its new position and has never needed further alteration.

The small number of students during these years also made possible much closer contact between staff and students, than can be the case with the larger numbers of today. The present staff would need to be about doubled to give the same staff-student ratio as existed in the first few years.

It was, for instance, possible during the war to erect the necessary machinery and run a long series of experiments, extending over nearly three years, on the drying and seasoning of timber. The students threw themselves enthusiastically into the work with the results that not only are a number of plants erected by private enterprise today, but one of the students of those days is now a leading authority on this kind of work.

One feature of the life of those early years which has persisted was the willingness of the senior students to act as laboratory assistants to the junior years thereby helping both the staff and themselves.

After the war the worst chaos resulting from it were over, a time of very rapid expansion dawned for the Engineering School. The Professor came back early in 1919 and the three original members

of the teaching staff were once more associated with the work of the school. Extensive planning and development were the order of the day. Sheds were erected beginning with the Scaddan Shed in 1920, already mentioned to be followed in 1923 by the Applied Mechanics Shed while the two sheds were connected in 1925. The policy of the school was not to erect anything so substantial that it could not be taken down and shifted without regret. The policy has fully justified itself. Although no shed has been completely demolished, so many internal arrangements have taken place as the place grew, that had the walls been of brick and mortar the cost would have been prohibitive.

The old "Sandwich System" was also reintroduced, but as the students now joining were younger, a five years course was introduced, at the same time, making the first year, and later in 1929 the second year, a full year of three terms. The fifth year of the new course is mainly devoted to specialised work.

One peculiarity of the system of the school curriculum is well worth mentioning, as it is possibly unique, that is the valedictory addresses given by the students in their fifth year. In this year, each student has to give a paper on his special subject to the rest of the students and the staff. It makes at least the good student give serious thought to some big engineering problem, and makes him try to present it in such a way that the less initiated, that is, the younger students, can understand it, while, at the same time, the staff can see that he really knows the subject about which he is talking. The system was extended in 1929, in so far as Electrical Engineering is concerned, wherein all formal lectures during the fifth year are given by the students themselves.

The curriculum as worked today since 1921 contains three Arts subjects, of which English is compulsory. The reason for making this subject compulsory is mainly that Junior English only is necessary for Matriculation in the Engineering Faculty.

The school also tries to avoid formal examinations by setting problem papers and allowing the use of books and reference notes in the examination room.

As the number of students grew, two facts commanded attention. The first was that the villa would no longer hold the student body, the other was that the staff could not possibly cope with the manufacturing of new material. Consequently, drawing and specifications were prepared for a new building of two stories, the lower suitable for lectures to a larger number of students by a smaller staff, the upper to give drawing room space for at least one hundred students at one and the same time. The drawings and specifications which allowed for an expenditure of about £3,000,

were submitted to the Government Architect and in his office demolished. Far more elaborate plans were substituted and the only part of the original plan which can be recognised in the building as it was erected in 1927 is the mezzanine floor. The times were good and the school certainly obtained a building which, at least for the time being, relieved the strain. The Government paid the bill and the cost was never disclosed.

Arrangements for the construction of the new building having been satisfactorily set in motion, the Senate at the request of the Faculty, went to the Government for money to equip the laboratories. They were successful in obtaining a grant of £5,000 spread over two years. At the same time the Government itself started an extensive policy of road building, and a laboratory became necessary. The result was the erection in 1928 of the present three laboratories nearest the wing of the old Villa, and a more adequate equipment of the laboratories.

The full effect of the fillip thus given to the school was still difficult to gauge. For the first time however it became possible to house the laboratory equipment in such a way that it could be got at from all sides, and more than a couple of students could experiment at the same time. An adequate workshop with at least some modern tools was installed and the place began to look like an Engineering School. Two second hand but nearly new boilers had been acquired at the auction of the Subiaco Electricity Supply Station in 1927. Various engines were secured on the scrapping of the H.M.A.S. Australia. Others were sent out from England from the war dumps, among them being four aeroplane engines, whilst a diesel generator was secured from a similar source. Others again were secured as a result of a change in municipal policy, resulting in a comprehensive scheme for the generation of all electric power in a central station at East Perth. These required further space, and the next laboratory shed, that nearest to the boiler house was finished in 1928. As a curiosity, there was acquired in 1925 an aeroplane shot down by the West Australian Forces during their fight in Gallipoli. This plane has caused both students and staff much concern by reason of its great size and the consequent difficulty in housing it. The students have had to demolish and re-erect it at least three times during its ten year residence at the school.

In 1927, a scheme for the testing of tanning timbers was undertaken under the leadership of the University Chemistry Department and the Government Forestry Department. This led to the erection of one large and one small shed, which when the experiments were completed a few years later, became very useful to the school. This, together with the Hydraulic Laboratory Shed built in 1932, and a combustion engine shed built in 1934 has resulted in the ground today being covered with about 2,000 square yards of laboratory buildings. While the equipment can well stand comparison with other engineering schools. On my visit to the London University in 1930, I was

both astonished and delighted to assert that the equipment in Western Australia was in no way inferior and in many ways superior to that of London.

It would be interesting indeed if the students between 1913 and 1930 could be induced to write their impressions of their years at school. However one tries to step into their shoes the very age difference makes such a task well nigh impossible.

Social life within the school was at first somewhat restricted; while the war lasted there were few student entertainments. After the war, however the position changed rapidly. The student body was naturally affected by the dance craze which followed the war, and in the Engineering School desks and chairs were moved out, the drawing room turned into a supper room, the women students invited down from Irwin Street, and told to provide the supper, and the dance went on from one room to another to the evident satisfaction of all concerned. Not a few of my audience will remember these dances if for no other reason than the partners of those days are now their wives.

Out of the beginning, grew the Annual Ball, which in the early days became the event of the year within the University and which has since become one of Perth's recognised social functions. It grew amazingly and the fact that the students year after year use their full power of imagination and invention in order to make the decorations and displays as novel and as attractive as possible, thereby not a little building a substructure for their own education, causes it to be looked upon by the whole school with great favour.

In other ways, the very isolation of the school and of its students threw them back on their own resources and at the same time increased their pride in the school and themselves. A distinct superiority complex was very pronounced and is existing today even when the isolation is far less. An even more important development than the Annual Ball fostering as it does class conscious camaraderie and pride in achievement was the foundation of what is today the Engineers Club, one feature of which is that it practically maintains the Engineering Library of the University and maintains it at a very high standard indeed. It was started with the various moneys left over from the dances, ^{which} were very small amounts indeed, but something which the committees responsible for the dances did not quite know how to dispose of. The students then suggested buying books for the loan between themselves books which otherwise would have been too expensive for the individual to purchase. Their confidence made them satisfied that they could conduct a library with success and the library was started. It went on growing, partly on the proceeds of entertainments and partly on the receipts of an increased club subscription, till, when in 1927 the University was able for the first time to appoint a full time librarian,

the Faculty was able to satisfy the Senate that the Engineering students had built up a library of so high a standing and with such a small borrowing loss, that it would be a pity to bring it under the new library rules. The only alteration made by the Senate was, at the request of the students, to arrange for the club subscriptions to be collected by the office, at the same time as other University fees were paid there.

From time to time criticism has been levelled at the club both from inside and outside the University, criticism which was aimed directly at the students and indirectly at the staff. But when one looks at the achievements in that direction in other Universities, and of other branches of our own, one cannot help thinking that the very success of the Engineers Club is largely due to the slight interference both from students and staff with its established rules; rules which were rarely placed on paper, but were generally handed down from one generation of students to another. One sore point with many critics has been the coat of arms sported by the club. It is supposed to lower the dignity of the club. Apart from the difficulty in explaining why a student club should be particularly dignified, may it not be suggested that the students adherence to their coat of arms is a first step towards that reverence for tradition which most people praise so ardently in the older universities. Another criticism come from the Engineering profession, that the strength of the club weakens the student section of this institution. There is doubtless something to be said for this criticism although the overseas institutions have more to complain of in this regard. But the success of our recently established student section of the institution has been for a division like ours in Western Australia, so marked, that it may be suggested that the very spirit of class consciousness which was inculcated in the students while active members of the club, will in the long run operate to the advantage of the institution.

The Engineers Club has more than once taken the lead in movements both inside and outside the University. Inside the effects have been most evident in the development of the Guild of Undergraduates, although few of them if any have been on Guild Committees. A caustic critic is often a spurt achievement.. Outside the University the most prominent instance of the club's activity was, perhaps, the erection of a memorial window to Dr Hancock, showing as it did, the clubs respect for hard and dangerous work unobstruively carried out.

The Faculty of Engineering was at first instituted as the Governing Body of the Department of Mining and Engineering directly responsible to the Professorial Board. The Professor of Mining and Engineering was its Dean and also a member of the Professorial Board. It was, however, soon found that it was unfair to the members of the Faculty to place aspects of students' conduct and progress before them, as the students themselves were often known, perhaps

even related to the members of the Faculty. Consequently, an administrative body was formed within the Faculty, consisting of its teaching members only. This body was to deal with everything appertaining to the students themselves; its decisions were not to be discussed in open Faculty meeting but merely reported, and it was enabled to report direct to the Professorial Board.

This administrative Committee of the Faculty is in actual fact nearer in its constitution to the other Faculties of the University than the Engineering Faculty itself. It should not be confused with the Board of Management, which as related elsewhere was established together with the School of Engineering and Mining.

In practice, the three bodies work together very well, however cumbersome the arrangement might seem on paper. The Faculty acts as an advisory body and its extra mural members are called upon to help both staff and students in all kinds of ways. The Administrative Committee deals with all relationships between the school, its students, and the rest of the University, and Board of Management deals with all matters relating to the school itself.

It has from time to time been suggested that to fall in line with the other Faculties of our own, the name constituting the Faculty should be altered to that of Advisory Board and the name of the Faculty should be used for the Administrative Board. Strictly speaking, these titles might possibly be more correct, but to the writer at least this seems a poor reason for altering something which has been for 20 years and still is working extraordinarily well.

There is no denying the very real help which the school has obtained from the non-teaching members of the Faculty. In addition to the stimulus which any body of teachers must naturally receive from frequent meetings with men actively engaged in the practice of the same profession, the school has also obtained direct help in many gifts of apparatus, books and machinery from the same source. It has from time to time called upon different professional members of the Faculty or their assistants to give either single lectures or series of lectures to the Engineering students. These services have been ^{given} to the University either free of any cost or at a purely nominal charge to cover the cost of expenses.

The inclusion of three Arts subjects in the present curriculum of the school is also very much due to the non-teaching members of the Faculty. It was, as a matter of fact, the Perth Division of this institution which inspired them to take this action, the reason being that many of the older engineers felt it as a handicap that they know very little about matters outside their

profession, and ascribed their disabilities in dealing with Under-Secretaries and Ministers of the Crown to this lack of general education. Whether or not this inclusion of three subjects Arts... are going to rectify the matter only the future can tell, but there are undoubtedly signs which seem to justify the action.

Many changes in the staffing of the school have taken place since its foundation. Mention has already been made of Professor Whitfield's appointment to the Chair and Mr Tomlinson as Assistant Lecturer in Structural Engineering later in the same year. In 1914 Mr Tomlinson's status was raised to that of Lecturer; from 1916 to 1919 he was Acting Professor and in 1922 given the title of Associate Professor. His death on the 16th May 1925 at the early age of 41 removed the first of the original members of the teaching staff of the school.

In 1915 Mr Fraenkel was appointed Lecturer in Electrical Engineering. This department was abolished in 1918. He again joined the staff as Part-time Lecturer in 1919, and was appointed Associate Professor in 1925.

In 1929, arrangements were set on foot by the University Senate for the construction of the Winthrop Hackett Buildings at Crawley. The supervision of this work and the administration of the bequest led the Senate to appoint a full-time permanent executive head. The Senate invited Professor Whitfield to take over the Vice-Chancellorship. He had already held the honorary position as Vice-Chancellor for the two separate periods from 1913 to 1915 and in 1926-27. However much of this step may have benefitted the University as a whole, there can be no doubt that it was to the detriment of the Engineering school. Not only was the school deprived of the services of the senior of its teaching staff, but the Vice-Chancellor also seemed to be unduly careful to avoid allowing his previous association with the Engineering School to prejudice the other departments of the University.

On Professor Tomlinson's death in 1925 a former student, Mr R.A. Oldham took over his lectures in Structural Engineering, but left the school the next year.

Mr A.T. Bowden was appointed Lecturer at the end of 1925, and in 1926 started lecturing in Mechanical Engineering, of which department he was given charge in 1928, at the same time as Mr O.F. Blakey, who had been appointed Lecturer in Structural Engineering early in 1927.

In 1928 what had still then been known as the "Department of Mining and Engineering" in the University of Western Australia was, on the recommendation of the Faculty of Engineering, by the Senate

of the University constituted as a School of Engineering and Mining with the following departments: Structural, Mechanical, Electrical, Metallurgical and Chemical and Architectural. The school is managed by a Board of Management consisting of the heads of the departments enumerated. The Dean of the Faculty is its Chairman and the board deals with all matters appertaining to the school.

At the same time as the board was constituted, it was decided that a teacher in Hydraulic Engineering was necessary to the school, and one of the school's first acts was to appoint Mr W.R. Baldwin-Wiseman as Assistant Lecturer in that subject. Mr Baldwin-Wiseman was appointed Lecturer in 1933.

Mr W.G. Townsend started in the Department in 1915 and was one of the first to enlist, took on his return his old position of mechanic. When, however, the school recovered its stride after the war, and testing for external interests became a serious problem in 1921, he was appointed Testing Officer and Mechanical Instructor, to be further promoted in 1933 to Assistant Lecturer.

The school has had and still has many part-time lecturers in various subjects but few of them have been connected with the school for any great length of time Mr G.M. Nunn is an exception in that he took up his present duties in 1915 and has given lectures and demonstrations in Surveying ever since.

A history of the school would hardly be complete without mentioning Mr A.S. Philip, who has been Laboratory Attendant and Engine Driver since 1916 and is consequently well known to all the students who have passed through the school.

Testing for outside interests has always been a part of the Engineering School's policy but it was greatly increased during the war, when not only did the school test the material but in certain cases manufactured it. This for instance was the case with chemically deposited copper upon which much time and work was expended, though not with any very marked success.

After the war the testing work of the school increased still further and soon special officers had to be appointed for the purpose. It was therefore necessary to charge for the undertaking of such work, and the real testing work of the school may be said to start from about 1921 when the school undertook to test the cement and seal the bags for the Swan Portland Cement Company.

Since then many W.A. firms can thank the engineering firm for placing their products in the forefront of their kind, helping to standardise their product and give it a Hallmark of quality. When tests were undertaken for the firms themselves their officers

were made aware of any departure from the attainable standard as soon as it occurred. While testing for the customer kept the firm on its mettle some manufacturers did not look with favour upon the latter side of the school's activity, but what was perhaps a vexation at the time, never-the-less, often proved a blessing in the end.

All kinds of tests have from time to time been carried out, though some had now and again to be refused for lack of apparatus. It was, however, always the policy to obtain such apparatus at the earliest opportunity. The school's testing laboratories are, in fact very well equipped for such a young university. There can be no doubt of the value of this testing work to the community at large and it also adds materially to the experience and insight into the commercial testing which the school is able to give its students.

With the extra-mural activities of the school it may be mentioned the steady support and stimulus which it has given to the technical education throughout the State. In the beginning this was merely a matter of recognising certain classes in the Technical College in Perth and the School of Mines at Kalgoorlie, provided they were conducted by competent teachers the effect was to raise the standard required for the teachers in these schools. Later, in 1926, more direct action was taken, in-so-far as Perth was concerned, in that certain courses which had been in abeyance for years, due to lack of staff and equipment, were now revived, the school providing both staff and equipment and the Technical College the students. This arrangement made it possible for the College to institute the various courses of the diploma in Engineering, which was recognised both by the Institution and the University. The move gave a much-wanted opportunity to those ^{young} men who from force of circumstance had to work during the day but wanted to improve the standard of their profession.

In reviewing the history of the Engineering School, one would like to be able to point definitely to some outstanding successes of its former students. This is difficult for two reasons, both of which result from the youth of the school. Few former students are old enough to be recognised as outstanding; on the other hand even in those days where outstanding success had already been achieved it is too early to say with assurance that the present success will be maintained. A detailed record of the achievements of former students must thus be left for a future historian of the school.

The great majority of former students have naturally enough stayed in Western Australia today. Many hold prominent positions both inside and outside the Government Services. Some critics may prefer to regard this as no tribute to the school, but as merely the result of a preference of West Australians for West Australians. There is, however, no denying the fact that the small minority of students who have gone

overseas have been able to hold their own in competition with students from the older universities. When all due allowances has been made for the natural superiority of the West Australian some share in the success of the students must be given to the school in which they were trained.

No extravagant claims are made for the teaching at the school, which most likely differs little from that of other places, but certainly for the spirit of the school and its very marked freedom from set rules or prejudices. This is perhaps its outstanding and its most distinctive characteristic.

To complete the picture it may be well to mention that, in 1929, the first ex-engineering student was elected to the Senate of the University. The second followed in 1931.

Former Engineering students and others who were responsible for the successful conduct of these elections, were not moved by the desire to advance special engineering interests but rather to maintain as close as possible a relationship between past and present members of the school.

What the future holds in store for the school it is, of course, impossible to foretell, but it is to be hoped that those who have passed through and are now passing through feel that the school has given them something worthwhile and that, as a consequence, their interest will be strong enough to make them try to improve on what is already there.

On this subject of the school's future progress, one word of caution may be allowed the writer, who has had more years as a student and as a teacher than he cares to contemplate. Those who are going on building up the school will be well advised never to forget that education in the abstract and character are far more valuable assets in life than academic knowledge. The school has so far been an organic growth, not a ready made institution planted down in our midst. All our past staff and students have taken a healthy part in the growth. They have contributed^{and} are still contributing to the resultant growth, others to come will have fresh contributions to make.

This is perhaps the only effective way of building up any human institution.

APPENDIX 11

The University received in 1927 from the late Robert John Gleddon, retired surveyor, and estate valued at more than £60,000, as a bequest for the provision of Scholarships and Travelling Fellowships in Surveying, Engineering, Mining and cognate branches of Applied Science. The estate is subject to certain annuities, and is to be allowed to accumulate for ten years.